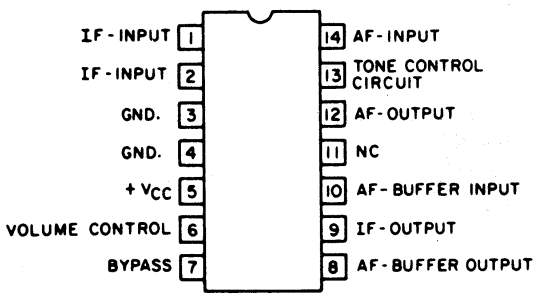
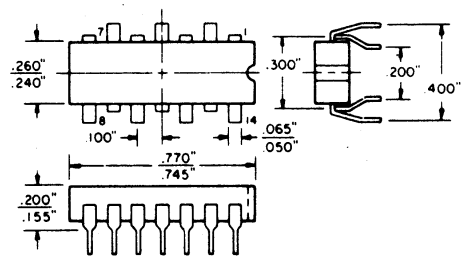
SYLVANIA ECG semiconductors

ECG712

TV/FM SOUND SYSTEM

- DC VOLUME CONTROL ELIMINATES NEED FOR SHIELDED CABLES
- EXCELLENT AM REJECTION - 50dB TYPICAL AT 4.5 MHz
- DIFFERENTIAL PEAK DETECTOR REQUIRES ONLY ONE SINGLE-TUNED COIL
- INTERNAL ZENER DIODE REGULATED SUPPLY
- LOW HARMONIC DISTORTION





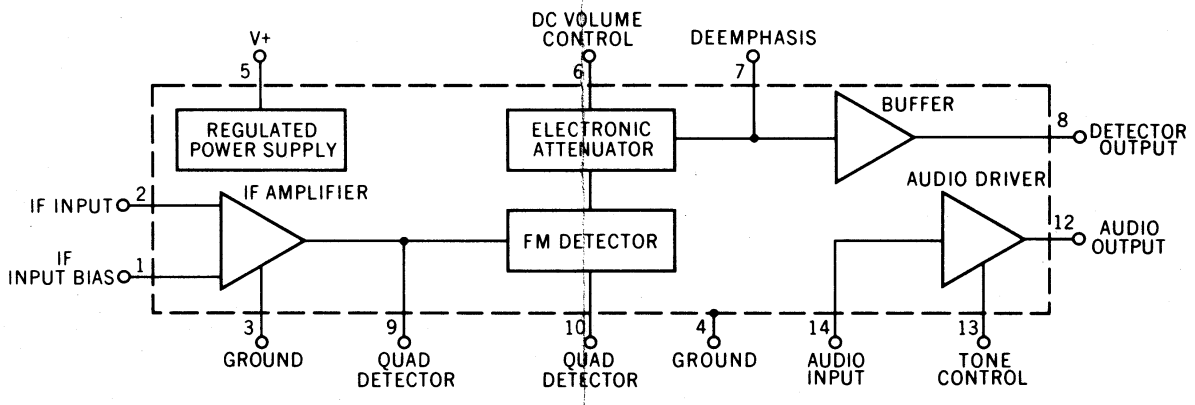
DESCRIPTION

The Sylvania ECG712 Monolithic TV/FM Sound System consists of a Multistage Limiting IF Amplifier, DC Gain (Volume) control, FM Detector, and an Audio Driver constructed on a single silicon chip. Excellent sensitivity, high AM rejection and an internally regulated power supply coupled with low external component requirement makes the ECG712 suitable for a wide variety of applications including TV Sound Channels, Line Operated and Automobile FM Radios and Mobile Communications Equipment.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	Note 1
Internal Power Dissipation (Note 2)	850 mW
Power Supply Current	50 mA
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	
Ceramic DIP	-65°C to + 150° C
Silicone DIP	-55°C to + 125° C
Lead Temperature Range	
Ceramic DIP (Soldering, 60 seconds)	300°C

BLOCK DIAGRAM



NOTES:

(1) V+ terminal may be connected to any positive voltage through a suitable dropping resistor, provided the dissipation rating is not exceeded.

(2) Rating applies to ambient temperature of 25° C. For ambient temperatures above 25° C, derate linearly at 6.67mW/° C.

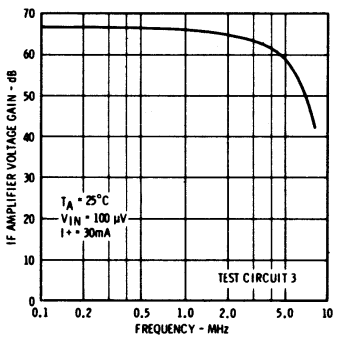
ELECTRICAL CHARACTERISTICS (T_A = 25°C, I^+ = 30 mA unless otherwise specified)

PARAMETER	CONDITIONS	TEST CIRCUIT	MIN	TYP	MAX	UNITS
STATIC CHARACTERISTICS						
Zener Regulating Voltage (V_5)			10.3	11.2	12.2	Volts
Supply Current (I_5)	V_{Supply} = 9.0V		10	16	24	mA
Internal Power Dissipation	I^+ = 33mA		343	370	400	mW
Voltage at IF Input Bias (V_1)				2.0		Volts
Voltage at DC Volume Control (V_6)				4.8		Volts
Voltage at De Emphasis (V_7)				6.1		Volts
Voltage at Quad Detector (V_9)				3.7		Volts
Voltage at Audio Output (V_{12})			4.0	5.1	5.8	Volts
DYNAMIC CHARACTERISTICS						
IF AMPLIFIER	(f_o = 4.5 MHz, FM±25KHz at 400 Hz, V_{IN} = 100μV)	1				
Input Limiting Voltage at -3dB point				200	400	μV
AM Rejection	AM = 30% at 4.5 MHz	1	40	50		dB
IF Transconductance	f = 4.5 MHz					
Magnitude				500		mmho
Phase Angle				46		degrees
Feedback Capacitance	f = 1.0 MHz, Pin 2 to Pin 9			<0.02		pF
Input Impedance Components	f = 4.5 MHz, Pin 1 to Pin 2					
Parallel Input Resistance				17		kΩ
Parallel Input Capacitance				4		pF
Output Impedance Components	f = 4.5 MHz, Pin 9 to Ground					
Parallel Output Resistance				3.25		kΩ
Parallel Output Capacitance				75		pF
DETECTOR	(f_o = 4.5 MHz, FM= ±25kHz at 400 Hz, V_{IN} = 100 mV)					
Recovered AF Voltage		1	0.5	0.75		Vrms
Total Harmonic Distortion		1		0.9	2.0	%
Output Resistance						
De emphasis Output				7.5		kΩ
Detector Output				300		Ω
ATTENUATOR						
Max. Attenuation	$R_x = \infty$	1	60	80		dB
Max. Play-through Voltage*	$R_x = \infty$	1		0.075	1.0	mV
AUDIO AMPLIFIER						
Voltage Gain	V_1 = 0.1 Vrms, f = 400 Hz	2	17.5	20		dB
Total Harmonic Distortion	V_O = 2 Vrms, f = 400 Hz	2		1.5		%
Undistorted Output Voltage	THD = 5%, f = 400 Hz	2	2.0	2.5		Vrms
Input Resistance	f = 400 Hz			70		kΩ
Output Resistance	f = 400 Hz			270		Ω

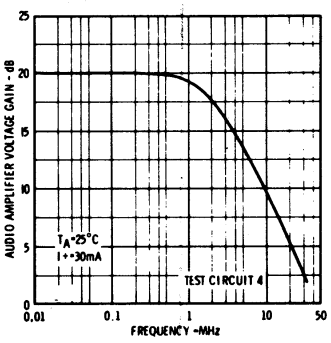
*Play-through voltage is the unwanted signal, measured at the detector output, when the volume control is set for minimum output.

TYPICAL PERFORMANCE CURVES

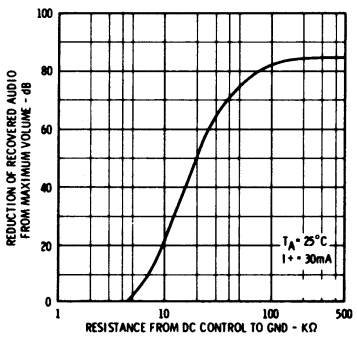
FREQUENCY RESPONSE OF IF AMPLIFIER SECTION



FREQUENCY RESPONSE OF AUDIO AMPLIFIER SECTION



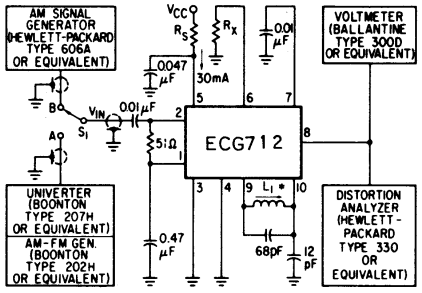
AUDIO GAIN REDUCTION VERSUS DC VOLUME CONTROL RESISTANCE



TEST CIRCUITS

TEST CIRCUIT 1

INPUT LIMITING VOLTAGE, AM REJECTION, RECOVERED AUDIO, TOTAL HARMONIC DISTORTION, MAXIMUM ATTENUATION, MAXIMUM "PLAY-THROUGH" TEST CIRCUIT.



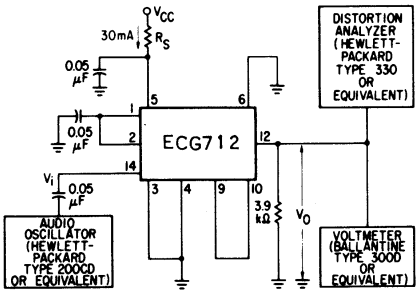
PINS 11, 12, 13, 14 NO CONNECTION

*L_1 = 16μH NOMINAL

$Q_{(UNLOADED)}$ = 50

TEST CIRCUIT 2

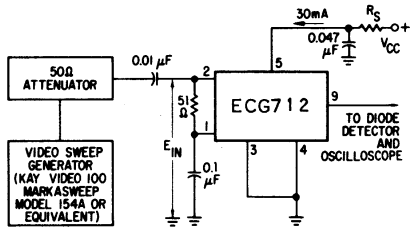
AUDIO VOLTAGE GAIN (UNDISTORTED OUTPUT)



PINS 7, 8, 11, 13 NO CONNECTION

TEST CIRCUIT 3

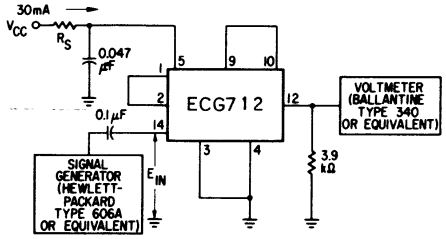
IF AMPLIFIER SECTION



E_{IN} = 100μVrms

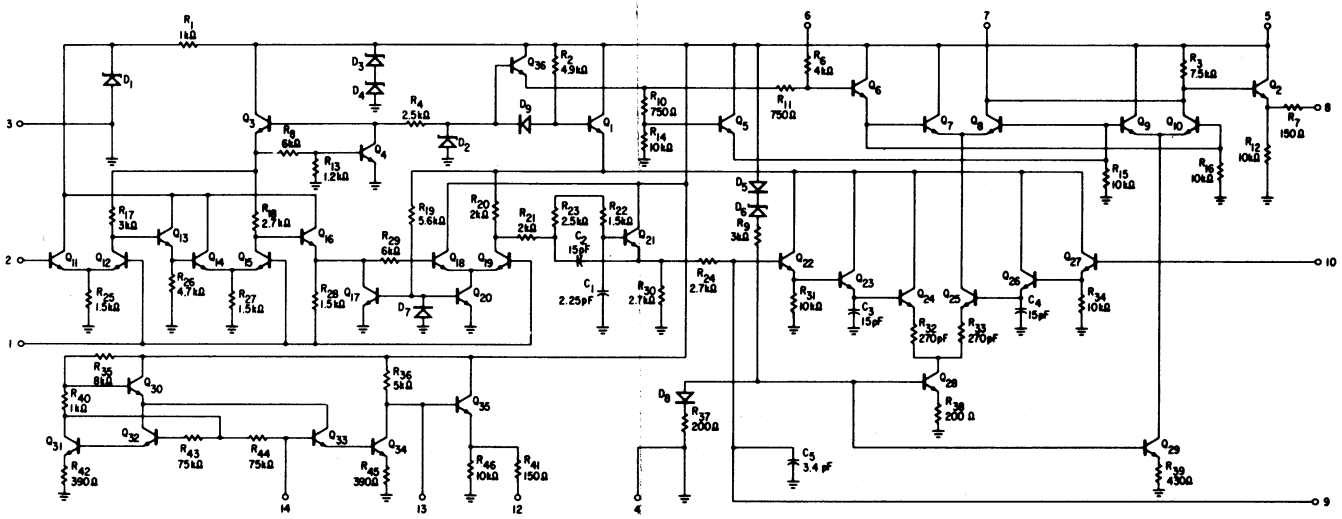
TEST CIRCUIT 4

AUDIO AMPLIFIER SECTION



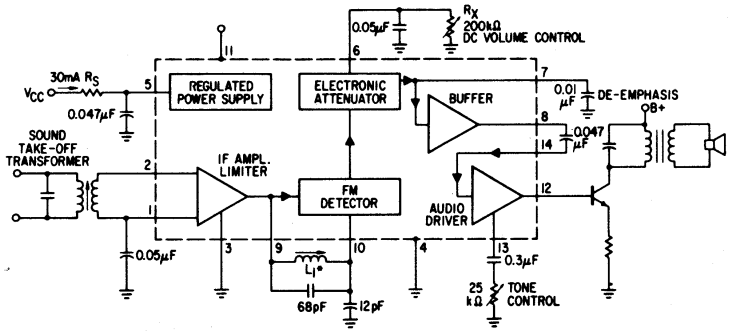
E_{IN} = 100 mV

EQUIVALENT CIRCUIT



TYPICAL APPLICATION

TV SOUND SYSTEM



*L_1 = 16μH NOMINAL , $Q_{(UNLOADED)}$ = 50

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